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BOTANY.

Development of the Ovule in Grindelia squarrosa.—The ovule in *Grindelia* arises by tangential division of the cells of the first, second and perhaps third hypodermal layers, resulting in an up-pushing of the floor of the ovarian cavity (figs. 1–4). As Coulter[1] says of *Taraxacum,* the ovule does not appear exactly at the bottom of the cavity of the ovary, but a little at one side. The ovule springs from the axis of the flower as is shown by the passing of the fibrovascular bundle directly from the axis to the funiculus. In this respect *Grindelia* agrees with *Helianthus* (figs. 16 and 17) and differs from *Taraxacum* in which, according to Coulter, the fibrovascular threads of the funiculus come from a carpellary branch of the axis. The young ovule early begins to curve upon itself, the single integument appears on the upper convex surface and, by growth beyond and around, completely enwraps the apex of the ovule, the nucellus (figs. 5–7). At this time we distinguish three portions of the ovule—funiculus, integument and nucellus. The nucellus consists of an axial row of cells covered by the epidermis. In the apex of the nucellus, immediately beneath the epidermis, is the archesporium (figs. 5 and 6). This divides into two and then four cells (figs. 7 and 8). By accelerated growth the most deeply situated of these cells absorbs or pushes the others toward the apex of the nucellus and becomes the embryo-sac (figs. 9–11). At the same time the epidermis of the nucellus shrinks and disappears. Concomitant with the degeneration of the nucellar epidermis the adjacent layer of the integument becomes greatly modified, forming what Hegelmaier[2] terms the "Endodermis." Its cells lengthen radially, and the cell walls become much thickened and resistant to the section knife. Of the stages between the embryo-sac with but one nucleus and the mature state of the same I have found few representatives. Enough was seen, however, to indicate that the typical order is followed (figs. 12–14). The nucleus undergoes a three-fold division. A tetrad is seen in the micropylar end. The usual number of the antipodal cells is two (fig. 13), though rarely a third is seen (fig. 14). They are situated in a linear series with the embryo-sac, being early marked off from the latter by distinct cell walls. They persist for some time after fecundation, and as in *Helianthus,* send out vermiform protoplasmic extensions that assist in tearing down the adjacent tissues. Shortly prior to fecundation the tissue just outside the endodermis begins to degenerate by losing its protoplasmic contents. With the development of the endosperm and the growth of the embryo, this absorption of the tissue of the ovule proceeds to such an extent that, as Hegelmaier[3] notes in *Helianthus,* the endodermis, with its contents, can be removed with ease. While this is going on the one-layered endodermis has become many layered except at its micropylar and antipodal ends (fig. 15). Its cells become rich in protoplasm at the expense of the surrounding tissue now rapidly becoming depauperate. The suggestion of Hegelmaier that this condition in *Helianthus* may be due to cultivation, etc., is of little value, since the same condition occurs in *Grindelia* and also in uncultivated *Helianthus.* Later, as the seed matures, the endodermis as such disappears, being represented only as a thin, compressed coat of the embryo.

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[1] Development of a Dandelion Flower, AMERICAN NATURALIST, Vol. xvii, No. 12, Dec., 1883.

[2] Über den Keimsack einigen Compositen und dessen Umhüllung. Bot. Zeitung. Nos. 50–52, 1889.

It is thus seen that the development of *Grindelia* agrees closely with that of *Senecio* described by Warming[4] and Vesque,[5] though the latter of course was considerably in error. *Conyza,* described by Guignard[6] has a similar development, but the antipodal cells are more numerous than in *Grindelia. Helianthus,* studied by Hofmeister,[7] and later by Hegelmaier,[8] agrees very closely with *Grindelia.* As in *Helianthus* the endodermis is strongly developed, in marked contrast to *Ageratum* where it is scarcely differentiated. Hegelmaier observes in the mature embryo-sac of *Senecio* five nuclei: the two synergidæ, the oösphere, and two secondary nuclei of the embryo-sac. The same is seen in *Grindelia.*

In a short notice of this kind, for the most part merely confirmatory of similar studies of others, it seems hardly worth the while to attempt to give titles of even the most important of the literature on the subject.—H. W. Norris, Grinnell, Iowa.

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[3] Loc. cit.

[4] De l'Ovule. Ann. Sc. Nat. 6, Sér. v. 1878, p. 176.

[5] Développement du sac embryonnaire des Phanérogames, Ann. Sc. Nat. 6 sér., vi, 1878, p. 237. Nouvelles recherches sur le développement du sac embryonnaire des végétaux phanérogames angiospermes. Ann. Sc. Nat. 6 sér., viii, 1879, p. 261.

[6] Recherches sur le sac embryonnaire des Phanérogames. angiospermes. Ann. Sc. Nat. 6 sèr.. xiii, 1882, p. 136.

[7] Entstehung des Embryo. Leipzig, 1849,

Neuere Beobachtungen über Embryobildung der Phanerögamen. Pringsheim's Jahrbücher, i, 1858, p. 82.

[8] Loc. cit.

EXPLANATION OF FIGURES, PLATE XX.

Abbreviations used.

a, archesporium; *ad*, daughter cells of archesporium; *ant*, antipodal cells; *axf*, fibrovascular bundles of the axis of the flower; *e*, embryo-sac; *em*, embryo; *end*, "endodermis;" *esp*, endosperm; *f*, funiculus; *i*, integument; *n*, nucellus; *o*, ovule, *of*, fibrovascular bundle of ovule; *ov*, cavity of ovary; *v*, part of vermiform extension of protoplasm of an antipodal cell.

Figs. 1–16 are of *Grindelia squarrosa*.

Fig. 17 is of *Helianthus annuus*.

ZOOLOGY.

Notes on a Nematode Parasite from the Chipping Sparrow (*Spizilla socialis*).—I have received from Mr. Wm. B. Marshall, Albany, N. Y., a parasite from the thoracic cavity of the chipping sparrow which appears to be new.

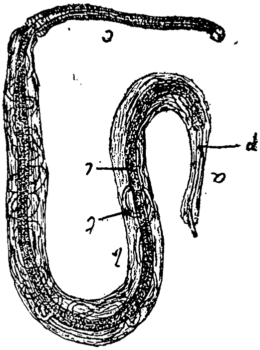

Fig. 1.

The sparrow was shot by Mr. Marshall on May 14, 1892, and the worm was found lying directly against the heart of the bird. The color of the worm while alive was a brilliant red. It is a male; the head is damaged but otherwise the specimen is perfect.

Although the diameter of this specimen is proportionally many times greater than that of any recorded species of *Trichosoma*, the body being not at all hair-like; and although the posterior spicule and its sheath present some difficulties when compared with descriptions of the various species of *Trichosoma* and the related genus *Trichocephalus*, I prefer to refer the specimen to the former genus, to which it is certainly closely allied, rather than to erect a new genus for its accommodation. I therefore place the specimen provisionally in the genus *Trichosoma* and propose the name *Trichosoma rubrum* for it.

The specimen has the following characters: Body cylindrical, with somewhat yielding walls, and presenting three distinct regions; an